Short note

The nectaries of *Phormium* J.R. & G. Forst. (Hemerocallidaceae)

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Abstract

Both species of New Zealand flax (*Phormium* spp.) have highly nectariferous flowers. The nectary openings are situated at the base of the superior part of the ovary, in the septal position. The sterile inferior half of the ovary is swollen and ruminate internally, and its chambers are presumably where the nectar is produced.

Keywords: nectaries - floral biology - *Phormium* - Hemerocallidaceae.

Introduction

In flowers of members of the Liliiflorae, in Asparagales in particular, nectaries are commonly "septal" in position (Dahlgren & Clifford 1982). That is, they are seen externally as short slits or depressions aligned with the ovary chamber's three septae and situated near the top of the (usually fully superior) ovary.

Such "septal nectaries" were first noted in several New Zealand genera of such affinity by Lucy Moore (Moore & Edgar 1970; Moore & Irwin 1978). The latter reference, for example, contains fine illustrations of septal nectaries in *Astelia*, *Cordyline* and *Xeronema*. For the New Zealand flax genus *Phormium* however, this and all other references I am aware of mention only that nectar accumulates at the base of the floral tube (Figure 1a, b).

Observations

Septal nectaries are present in both species of *Phormium* (*P. cookianum* and *P. tenax*). They are the usual three in number, each a minute slit in a hemispherical depression (*c.* 0.5 mm diameter) at the base of the ovary wall, where this slopes down and out towards the united bases of the stamens and perianth members (Figure 1c). As the fruit grows the nectary slits are more easily observed, at the base of each of the three capsule-valves.

These minute slits are just the openings of the nectar-secreting system. A longitudinal section of a *Phormium* flower

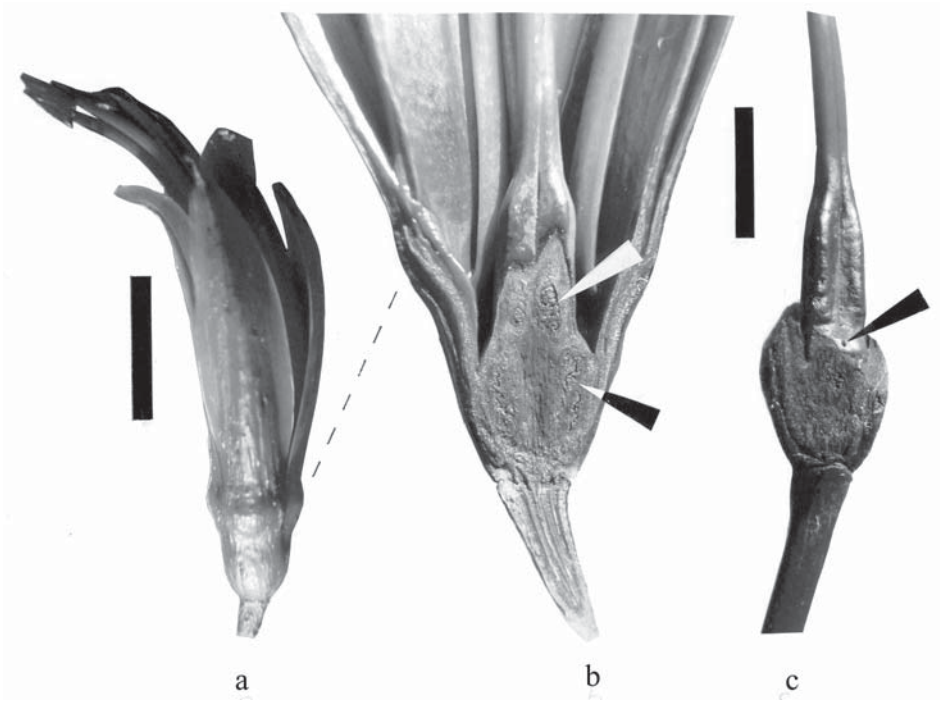

Figure 1. *Phormium tenax* flower: a, whole flower at anthesis, the dashed line indicating the expanded bases of the sepals, several mm above the base of the nectar-accumulating floral tube. Scale bar 1 cm. b, front part of floral tube removed, the ovary cut obliquely to show ovules in fertile superior half of ovary and ruminate chamber in inferior sterile half of ovary, both arrowed; dashed line as in a. Scale bar 5 mm. c, floral tube removed, a nectary-opening showing (arrow) at the base of the fertile superior part of the ovary; scale bar as b.

shows that the ovary is not superior as usually described, but half-inferior. Only the superior half bears ovules. The inferior, sterile half is fused with the stamens and perianth to form a swollen fleshy subspherical structure *c.* 5 mm in diameter. (This is not receptacular in nature, since it meets the pedicel below at a distinct articulation). A cut made down through a nectary slit shows the lower half of the ovary to have three ruminate-walled caverns directly below the three septae of the ovary chamber (Figure 1c; 2). Dissection further demonstrates that each cavern communicates with the nectary-opening above it. Squeezing the base of the flower will sometimes cause nectar to emerge from the nectary openings.

The size and nature of the tissue of the inferior part of the ovary would explain how it is that New Zealand flax can produce such a copious nectar flow. In New Zealand the principal native pollinating agents are honeyeater birds such as the tui, *Prosthemadera novaeseelandiae*; see for example Craig & Stewart (1988). *Phormium tenax* is also indigenous to the Norfolk Island group. On the main island today it is probably pollinated mainly by honey-bees, but on Phillip Island the native gecko *Christinus guentheri* still survives and is an assiduous nectar-taker (Owen and Beryl Evans, pers. comm.).

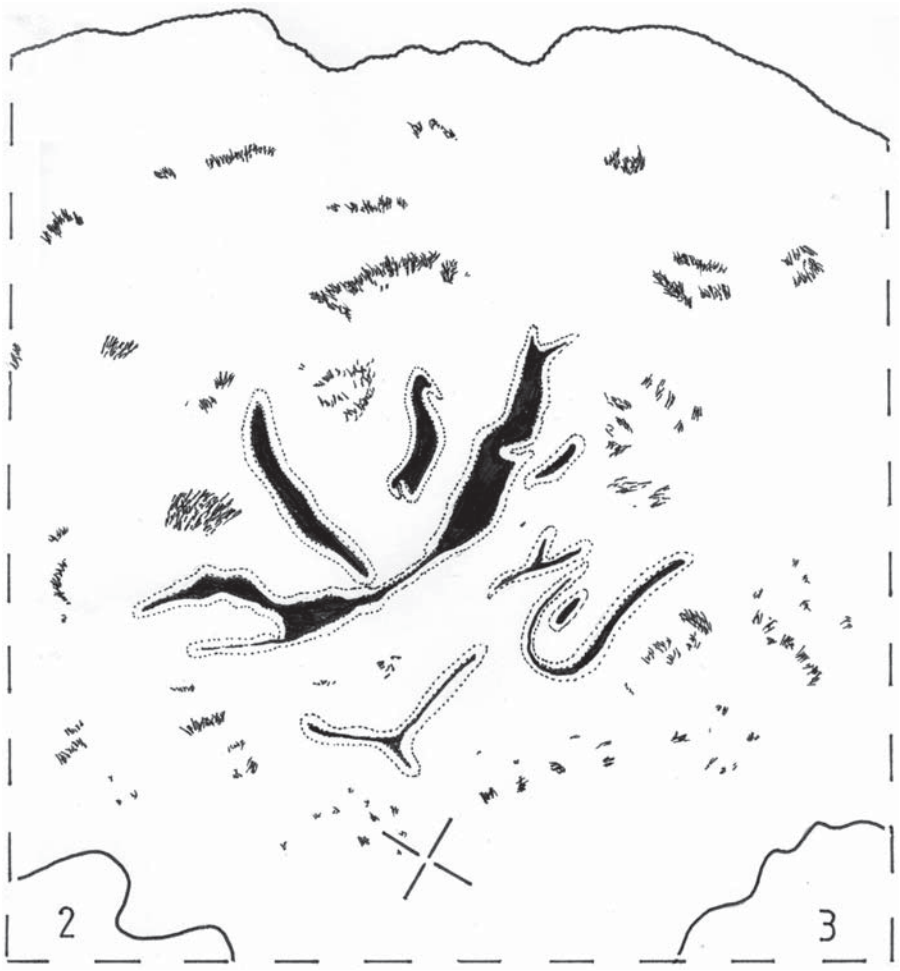

Figure 2. *Phormium tenax*, partial transverse section of inferior part of ovary. Depicting the glandular-lined chambers (black) below one of the ovary's three septae; positions of the other two chambered regions marked 2, 3. Vascular bundles shown ragged. Ovary at section level is *c.* 5 mm diameter; a cross marks its centre.

Acknowledgements

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